

IV.

NOTICE OF BRONZE CELTS OR AXE HEADS, WHICH HAVE APPARENTLY BEEN TINNED; ALSO OF BRONZE WEAPONS AND ARM-LETS, FOUND ALONG WITH PORTIONS OF METALLIC TIN NEAR ELGIN IN 1868. BY JOHN ALEXANDER SMITH, M.D., V.P.S.A. SCOT. WITH CHEMICAL ANALYSIS, BY DR STEVENSON MACADAM, LECTURER ON CHEMISTRY, &c.

In June 1862 I called the attention of the Fellows of the Society to the fact that the Romans were acquainted with the art of tinning metals, as shown in a bronze patella found in Roxburghshire, which I had the pleasure of presenting to the Museum of the Society, and an account of which is published in vol. iv. of our Proceedings. Dr Stevenson Macadam analysed for me the coating of white metal lining the interior of the vessel, and found it to consist of nearly equal parts of tin and lead. There has since (in March 1865) been presented to the Museum by Sir William Maxwell of Monreath, Bart., another example of a Roman bronze patella of large size, and in better preservation, also showing a distinct coating of a white metal or tin on its interior. Both of these bronze vessels had apparently been finished on the lathe after being tinned, the regular markings of the tool being distinctly visible.

This patella was found, with bronze vessels and other relics of antiquity, in exploring a crannog, or artificial island, in Dowalton Loch, Wigtownshire. It is figured along with some of these vessels in Plate X. vol. vi. of the Proceedings, p. 109, where the articles are described. None of the bronze vessels, however, except the patella, showed any traces of having been tinned.

It would appear, however, not improbable that the art of tinning metals was known and used at perhaps an earlier period; at least if we may judge from the class of weapons which I have now to describe. They belong to what has been supposed by some antiquaries, to be one of the earliest forms of metal weapons made by man, the simple wedge-shaped axe-head or celt, the form of which is believed to have been copied from the wedge-shaped axe-head or celt of stone, belonging, as has been fancied, to a still earlier time.

Mr Joseph Anderson, the Keeper of our Museum, when looking over and re-arranging the various articles in the Museum last autumn, was attracted by the peculiar appearance and smooth surface of one of the bronze celts, and to it he directed my attention. On examining the celt, it was evident that its flat and broad surfaces were covered over with a whitish-coloured metal coating, seen distinctly enough through the dark colour which now covers the surface to a considerable extent. The coating was metallic in its appearance, and was unlike any variety of bronze patina with which I was acquainted; and the celt being broken across the upper part into two pieces, the outer surface was seen to form apparently a distinct metallic coating over the surface of the celt. We came then to the conclusion that the celt was in all probability not simply covered with a coating of patina on its surface due to atmospheric or other causes, but had possibly been either plated or tinned artificially.

Accordingly, I placed the celt in the hands of Dr Stevenson Macadam for a chemical analysis of its outer coating, and made inquiries at the same time as to the probability of a bronze weapon, formed, of course, of copper and a small proportion of tin, when weathered, throwing up a patina of nearly tin alone. Shortly after, I was favoured with the following notes of his investigations:—

“On removing a portion of the surface of the bronze axe-head, and subjecting it to chemical analysis, I obtained the following results:—

Tin,	35·84
Copper,	64·16
	<hr/>
	100·00

“In taking off the coating from the axe-head, I was compelled to remove some of the bronze itself, and hence the origin of the copper. It is apparent, therefore, that the tin is in much larger proportion than in modern or ancient bronze, and such may be accounted for by the axe-head having been purposely tinned. It is, however, possible that the weathering of a bronze implement might rust and remove part of the copper, and thus leave the tin in excess, but my belief is that the tinning is the more probable cause of the peculiar appearance; and, therefore, that the celt, after being fashioned, has been subjected to the process of tinning. The coating on the surface of the celt contains no silver.

STEVENSON MACADAM.”

“ANALYTICAL LABORATORY, SURGEONS' HALL.”

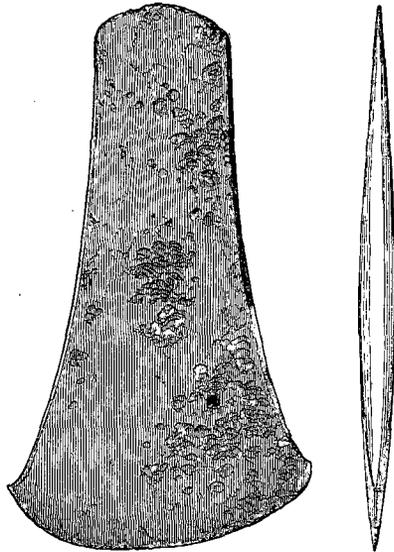
The celt, we may therefore assume, was in all probability tinned, to protect it from the influence of the weather, and keep its surface clean, and free from the oxidation of the metal.

This bronze celt was one of seven found on the hill of Fortrie of Balnoon, parish of Inverkeithney, Banffshire; it is formed of a bright yellow bronze, and measures five and three-quarter inches in length, by three and a quarter inches of greatest breadth across its face.

On looking carefully over the other bronze axe-heads in the Museum, to see if there were any more showing traces of this coating of tin, another was discovered which in this respect seemed to correspond with the one now described. This bronze celt was larger in size, measuring $6\frac{3}{4}$ inches long, by $3\frac{1}{2}$ inches in greatest breadth, and was of a rather dark colour, with traces of a whitish metallic appearance on its flat and smooth surfaces; the thin edges had been pared, apparently to test the metal of which it was composed, and here the white metallic coating was absent. This bronze celt was presented to the Museum of the Society

as long ago as October 1784, by Alexander Keith, Esq. of Ravelston, and is described in the list of the donations to the Museum, published in the "Archæologia Scotica," vol. iii. p. 32, as:—

"An ancient instrument of a metal resembling gold, in shape like the head of a hatchet, seven inches in length, three and a quarter inches broad at one end, and one inch and a quarter at the other. Found about a foot under ground in the south-east end of the Western Hill of Ravelston."



Bronze Axe-Head or Celt found at Sluie, Morayshire ($5\frac{1}{2}$ inches in length).

Ravelston Hill, I may remind you, forms part of Corstorphine Hill, closely adjoining the city of Edinburgh. The gold-like appearance, as it is described, of the rich yellow bronze, of which the celt is composed, discovered by cutting the surface, explains its bearing marks of having been cut or pared along its thin edges. The tin coating, however, still covers nearly the whole of the flat and smooth surfaces of the rest of the axe-head.

There are also in the Museum two other celts or axe-heads of a some-

what similar character and appearance. They were found at Sluie, on the river Findhorn, in the parish of Edenkille, Morayshire, along with a broad dagger of bronze, which measures 11 inches in length, and $3\frac{1}{2}$ inches broad at the rounded base; which is pierced with four large rivet holes for the purpose of attaching it to a handle.¹ These weapons were presented to the Museum by Sir John Dick Lauder, Bart. in 1861. (See the annexed woodcut of one of them, which shews the general style and shape of these bronze axe-heads.)

Dr Stevenson Macadam was asked to analyse the coating on these celts also, so as to compare them with the first one, which perhaps, though now imperfect, shows most distinctly the coating of white metal on its surface. Dr Macadam has accordingly kindly furnished me with the following analyses and notes :—

“ I have analysed the surface coatings of the bronze axe-heads from Ravelston Hill, Mid-Lothian, and Sluie, Morayshire, and find them to consist of much tin, with some metallic copper, and a large percentage of carbonate and hydrate of copper. The analytical results were as follows :—

	Ravelston Hill.	Sluie.	
Tin,	37·26	24·36	32·78
Copper,	10·23	15·49	18·14
Carbonate and Hydrate of Copper,	52·51	60·15	49·08
	<hr/> 100·00	<hr/> 100·00	<hr/> 100·00

These bronze axe-heads have apparently been subjected for a lengthened period of time to the weathering action of moisture and air, and hence the rusting away of the copper as the hydrated carbonate. Considering the large proportion of the copper rust, it is possible that the high percentage of tin may be partly due to the gradual rusting away of the copper of the bronze, which would leave an excess of tin on the surface, though I am inclined to think that the axe-heads have been purposely tinned. I may state that the coating on these bronze axe-heads was much softer than that on the axe-head examined by me previously.

“ STEVENSON MACADAM.”

¹ Proc. vol. iv. p. 187, 1863.

The notes of Dr Stevenson Macadam on these last analyses seem to give more importance to my previous inquiry as to the possibility of the copper weathering more rapidly than the tin, and leaving the latter in excess over the surface of the bronze. I would, however, be inclined to ask the chemists if a patina formed on bronze by the weathering away of the copper would show the tin as a uniform white coating over the surface of the metal, and not rather as scattered patches, or as a granular-like instead of a uniform smooth and polished surface. On this point I desire more information.

The apparent rarity of this white metallic coating on bronzes, appears to me, to amount almost to a proof in favour of these few examples having been really tinned. In this way their white metallic appearance is certainly most easily accounted for.

I have not been able to find any instance on record of an ancient bronze axe-head covered with a coating of tin, so I suppose these may be the first that have been observed and recorded, although it is not improbable that examples of a similar kind have been simply overlooked.

In the eighth volume of the "Archæological Journal," 1851, under the Notices of Archæological Publications, at p. 112, a figure is given of an ancient bronze dagger-blade, found along with a bronze celt at Bracklesham Bay, near Selsey, on the coast of Sussex, which is described as measuring "7½ inches in length, and it is coated with a *black* patina of tin." The blade and the celt were found "in a bed noted amongst geologists as containing abundance of a large bivalve shell in a fossil state."

This dagger-blade may have been possibly coated with tin at the first, and by weathering or staining, it had become partially changed to this dark coloured surface.

Another instance of a bronze dagger, which appears to have been silver-plated, or perhaps tinned, is incidentally described in the "Vestiges of the Antiquities of Derbyshire," by Thomas Bateman, London, 1848. From the rarity of the occurrence of such a weapon, and the interesting character of the circumstances of its discovery, I think it best to quote the detailed account which is given there of the opening of the barrow in Derbyshire, in which it was found, on the 15th August 1846. The barrow was upwards of 20 yards in diameter, and surrounded by a circle of very large stones. In the centre was an erection of large stones, in

which were found pieces of an unusually coarse urn, some calcined human bones, and numerous rat bones. Under the large stone, which formed the base of the structure, was a cist sunk below the natural soil; it was walled round with flat stones, and had for its floor a level surface of natural rock:—

“In this grave was a skeleton of large dimensions, lying on its left side, in a contracted posture; behind the head was a brass dagger of the usual type, measuring six inches and a quarter in length, and in the highest preservation; it has the appearance of having been silvered, and still retains a brilliant polish; when deposited it had been inclosed in a wooden sheath, the remains of which were very perceptible at the time of its discovery. Near it were two instruments of flint, and two more were found during the progress of the examination of the tumulus.”—P. 90.

Mr Bateman uses the word brass occasionally for bronze, and figures, in some instances, the usual short broad-bladed and tapering bronze dagger with large rivets to attach it to a handle; the one described being probably of a similar kind. The whole character of the tumulus and its contents bespeak a great antiquity; so that we have here apparently an instance of a plated or tinned weapon occurring along with an early British interment.

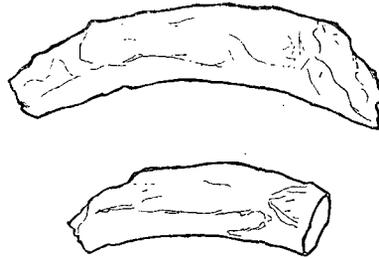
Sir W. R. Wilde, in his valuable “Descriptive Catalogue of the Antiquities of Animal Materials and Bronze in the Museum of the Royal Irish Academy,” Dublin 1861, states at p. 395, that—

“Several of the best preserved and most highly decorated celts in the collection are covered with a patina, or thin layer, or what would appear at first sight to be a lacquer or varnish, like that applied over modern brass, to protect it from the oxidising effects of the atmosphere. It would be interesting to find that our ancient metallurgists adopted means for defending the surface from oxidation.” In a foot note he adds—“On a celt which I submitted to Dr Aldridge some years ago, he found the patina or varnish to be of a vegetable nature, resembling a gum resin. This organic matter may, however, have been derived from the locality where the article lay.” It is evident, therefore, that Sir W. Wilde had not observed any appearance of tinning on ancient bronzes, and I am glad to be able to bring forward these instances of ancient bronze celts, showing at least the probability that their surfaces had been, as indeed they

still are to a certain extent, protected from oxidation, shall I say, by the important metallurgic art of tinning.

Discovery of Bronze Weapons, &c., with portions of Metallic Tin, found in Morayshire.—I have now to refer to a discovery of much interest, where small portions of bars apparently of metallic tin were found along with various bronze weapons and armlets, in Morayshire in 1868. These articles have now been deposited by the Queen's Remembrancer in our National Museum of Antiquities. As a notice of their discovery was published at the time in the local papers by the Rev. Dr George Gordon, of Birnie, I applied to him, and he has kindly furnished me with the following details :—

“The bronzes and bits of tin were discovered about April 1868, by —— Sime, while ploughing a mossy field on the south side of the farm of Achtertyre, which is about half way between the manse of Birnie and the Priory of Pluscardin. The moss, or part of the present farm of Wester



Portions of Metallic Tin found at Achtertyre, Morayshire (actual size).

Achtertyre, in which the articles were found, is called “Tammiroo.” The find consisted of—

- 1 Bronze celt with socket and loop ;
- 2 „ spear heads, one plain the other ribbed ;
- 2 „ entire rings ;
- Several broken ditto, probably forming part of 4 ;
- 4 Broken bits of tin.

“Some time after I heard of the discovery, I went to the spot with the farmer, and was told that it had been thoroughly searched, by digging with the spade for some yards round it, but that nothing else was seen. There was neither a cairn nor collection of earth—to raise the place above the level of the field, which had not been long in cultivation. It was no deep ploughing that turned them up. They were probably deposited or dropped, *in cumulo*, when the place was literally a moss or quagmire.”

The bronze looped celt has the socketed part very long (about 3 inches), and the blade, which is broken, is thin and chisel-like in form.

Of the spear heads, one is broken across between the socket and blade; the other, which is perfect, is slightly larger, and more finished in detail. It is leaf-shaped and measures $11\frac{1}{2}$ inches in total length, the blade being $9\frac{1}{8}$ inches, in length, and the raised and tapering socket runs through the blade almost to its termination. The socket is pierced with two rivet-holes in a projecting fillet which runs down, forming the termination of a bead, on each side of the central rib of the spear-head. (See Plate XXVI. fig 1.)

The bronze rings or armlets consist of three plain penannular rings, measuring about $\frac{3}{4}$ of an inch in thickness across the middle, and terminating in slightly enlarged projecting extremities. (See Plate XXVI. fig. 2.) The others are portions of three or perhaps four rings, smaller and more slender in character, measuring about $\frac{1}{4}$ of an inch in thickness across the middle; they taper gradually towards the extremities, which are slightly knobbed. Some of them show from three to five slight ribs or notches on the outer surface of each extremity. In the Museum of the Society there are other three perfect examples of this last peculiar variety of tapering penannular rings. Two were found with various others, along with nine bronze celts, on the farm of Redhill, near the hill of Benachie, Aberdeenshire, they measure $2\frac{3}{4}$ inches in diameter, and were presented to the Museum by Dr John Stuart in 1853. (Proc. vol. i. p. 137.) (See Plate XXVI. fig. 3.) Another was found in a peat moss at Conage, parish of Pettie, Inverness-shire, and was presented to the Museum by the Dowager Lady Dick Lauder in 1861. (Proc. vol. iv. p. 299.)

Lastly, the pieces of tin are four in number, and appear as if they had

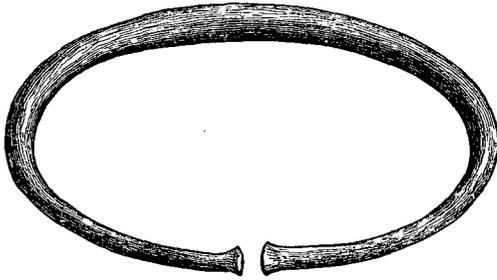


Fig. 3.
(Actual size.)

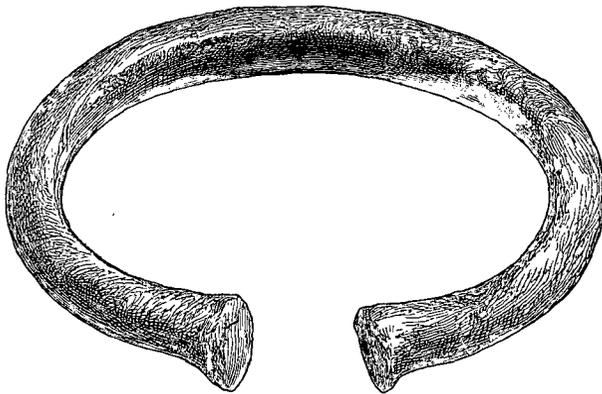


Fig. 2.
(Actual size.)

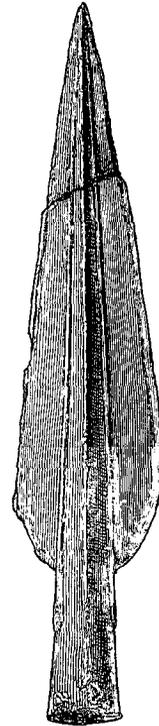


Fig. 1.
(11½ inches long.)

SPEAR HEAD AND ARMLETS OF BRONZE.

Figs. 1 and 2. Found at Achtertyre, Elginshire.

Fig. 3. Found at Benachie, Aberdeenshire.

been the broken portions of one piece of metal, they measure about $\frac{3}{4}$ of an inch in thickness, and altogether about 6 inches in length, and weigh 1240 grains Troy. The coating on the surface of the metal is dull and white, like white lead, probably formed of the carbonate of the metal, but it shows the clear white metal when the surface is cut. (Two of the largest portions of the tin are figured in the preceding woodcut.)

Here, then, we find a collection of ancient bronze weapons and ornaments, and along with them these broken portions of metallic tin. These last, from their slightly curved outlines, you might fancy may have been portions of a broken ring, it may be armlet, but it is, perhaps, more probable they were simply ingots, or portions of a small bar of tin, like the ingots of silver in the Museum, which have been found with manufactured gold and silver ornaments in different parts of the country.

I asked Dr Stevenson Macadam to be good enough to make a chemical analysis of these small portions of tin, and received from him the following note :—

“The small rod-like portions of tin give the following results on analysis :—

Tin,	.	.	78·66
Copper,	.	.	None
Lead,	.	.	21·34
			——— 100·00

These proportions represent a solder, containing nearly 4 of tin to 1 of lead, which would fuse about 365° F., whilst the plumber's *sealed solder* of the present day contains 1 of tin to 2 of lead, and fuses at 441° F. The low fusing point of the alloy under examination would enable it to be employed with comparative ease for coating or *tinning* of bronze implements, such as the axe-heads previously analysed.

“STEVENSON MACADAM.”

May this large apparent mixture of lead with the rarer metal tin help to explain the frequent more or less abundant presence of lead in the composition of ancient bronze weapons, or ancient bronzes generally? Let me remind you, also, that the tinned lining of the Roman pots, previously referred to, contained a very large proportion, almost a

half, of lead. It is not impossible that these bronze weapons found along with this tin, may belong to about the time of the Roman occupation of Britain.

These portions of tin, I am inclined to consider, have been taken to the north of Scotland in the course of an early commerce, to be used in various metallurgic arts. This is, however, the only instance known to me of any portions of ancient metallic tin being found in Scotland.

I do not remember to have noticed any instances recorded of large rings or armlets of tin being discovered in Britain. Some curious articles of tin are however described in the "Archæological Journal," vol. viii. p. 212, 1851. These consisted of various small pennanular rings of a white metal supposed to be tin, which were found in a rude clay urn beside a human skeleton, under a tumulus on the hill known as "Dundon Beacon" in the parish of Compton Dundon, near Somerton. The discovery was described by Mr Stradling, of Roseville, Bridgewater, who states that "the metal is now much oxidated; the ring massive, and pennanular, diameter rather more than three quarters of an inch, bearing a close resemblance in dimension to the small type of golden ring-money often found in Ireland, and occasionally in this country. Mr Stradling considered those remarkable rings of white metal to have been the circulating medium in very early times." It is to be regretted that the true character of these small white metal rings was not definitely set at rest by a careful chemical analysis. The discovery of an inscribed patera of tin is recorded by Borlase in his "Cornwall," and a cup of tin found in the same county is figured in the "Archæologia," vol. xvi. Plates ix., x.

The discovery of pieces of metallic tin, associated with bronze weapons, as in this instance in Morayshire, appears to be of the greatest rarity. Dr John Philips, indeed, in a valuable memoir, "Thoughts on Ancient Metallurgy and Mining among the Brigantes, and in some other parts of Britain, suggested by a page of Pliny's Natural History," Proceedings of the Yorkshire Philosophical Society, 1848, states that:—"Cornwall chiefly, if not wholly, supplied the tin which entered so many ways into the comforts and necessities, during peace and war, of all the nations surrounding the Mediterranean and Euxine, Baltic and German Ocean; in fact, the world as distinctly known to the Roman geographers."

—"There is," Mr Philips says, "I believe, no instance of a single bit of pure tin or pure copper being found with the numerous celts, which occur in so many parts of England; nor is there any other proof given that the direct union of tin and copper was effected by the natives of Britain." Copper is so abundant in Cornwall that it might tempt us to the other hypothesis; but this copper is a sulphuret, united to the sulphuret of iron, in deep veins, and in a matrix of quartz; and these are things which render the production of pure copper one of the most refined operations in smelting. Cæsar tells us, the brass used by the natives of Britain was imported ("ære utuntur importato"). Probably Cyprus,—colonised by the Phœnicians, to which old authors refer as the original source of brass, with its ancient copper mines (Tamassus), and which has given its name to the metal, might be one of the points from which bronze radiated over the Grecian, Roman, and Barbarian world."

Mr J. J. A. Worsaae on the other hand, in his "Primeval Antiquities of Denmark," translated by W. J. Thoms, London, 1849, states, that from the great similarity in composition of all the early bronze weapons, he thinks it is "highly probable that the ancient bronze . . . was diffused from one spot over the whole of Europe; which spot may be supposed to be England, because, not to mention the quantity of copper which that country produces, its rich tin mines have been known from the earliest historic periods to the nations of the south, while in the other parts of Europe there occur only very few and doubtful remains of other, and far less important tin mines, which we are justified in believing to have been worked at that time. It must, however, be observed, that according to Cæsar, the Britons in his time used imported bronze" (p. 45).

Mr Worsaae believes that the bronze imported into the north of Europe was cast there into the various weapons and ornaments characteristic of the particular districts where they were made.

Later analyses of bronzes in this country and elsewhere, seem to show a greater variety in the relative proportions of the copper and tin than those described by Mr Worsaae; and the discovery of moulds of various kinds for casting bronzes in other countries as well as in Britain, suggests at least the possibility of the people of different countries melting the pure copper, and adding to it, it may be, a proportion of tin; as well as simply melting the prepared bronze itself.

With regard to Mr Philip's statement that no pure copper had been found, he refers to the account of a simple celt or axe-head in the museum of the Duke of Northumberland at Alnwick Castle, which was found in a moss in Northumberland. It resembles pure copper, he says, "but no test has been used to ascertain the fact of its being of that metal." I may mention, however, that an axe-head, stated to "consist wholly of pure copper," was found in Ratho Bog, near Edinburgh, and was brought under the notice of the Society of Antiquaries of Scotland by Sir David Brewster in 1822. An account and figure of it is published in the "Edinburgh Philosophical Journal," vol vi. p. 357, 1822.

In Ireland, also, Sir W. R. Wilde, informs us, in his "Catalogue of the Antiquities in the Museum of the Royal Irish Academy," there have been found—"Copper weapons, apparently the forerunners of the mixed metal bronze or brass." The various articles of copper preserved in the Museum consist of some thirty "Celts, evidently of the very earliest pattern and greatest simplicity in construction, a couple of battle-axes, a sword blade of the curved broad shape usually denominated scythes, a trumpet, a few fibulæ, and some rudely-formed tools." (p. 336.)

In answer to some queries addressed by Mr Joseph Anderson to Mr Oscar Montelius, of the National Museum of Stockholm, on the discovery of articles of bronze and tin together, in the north of Europe, Mr Montelius writes:—"Tin and bronzes are but once found together in Sweden. It is the find at Langbro, not far from Stockholm; see 'Antiqvarisk Tidskrift for Sverige,' iii. p. 258. These were found in a peat bog:—

"(a) A large broken rough ring of tin, weighing 510 grammes. The following chemical analysis was made of it in 1859 by Professor Erdmain:—

"Tin,	:	.	.	95·81°/.
Lead,	.	.	.	3·79°/.
			99·60°/.	

(b) Three bronze celts of different shapes; one of them is figured page 258. (c) A broad thin band (collar ?) of bronze, figured page 259. (d) Seven collars of bronze, all of the same form, one of them figured page 260. (e) Four double spiral rings of bronze, page 261. (f) A broad simple bracelet (?) of bronze, without ornaments. (g) Two large brooches

of bronze, figured page 262. (*h*) Two large pins of bronze, figured page 263. All these valuable antiquities are preserved in our Museum."

Mr Montelius also describes this discovery at Langbro in his valuable "Bronsaldern I Norra Och Mellersta Sverige, Stockholm, 1871," where he has figured several of the bronzes; none of them correspond in character to those found with the tin in Scotland. The collars, or "Halsringar," as he designates them, *Scottice* Hause (or throat) rings are each formed of a rod of bronze, tapering towards its extremities, which are hooked together. The ring is twisted on itself, so as to form a series of short alternately reversed spirals; and is similar in character to an imperfect one in our Museum, brought, I believe, from the north of Europe. It is interesting, however, to find that this tin ring also contains a proportion of lead, though much less than our Scottish example. Mr Montelius also states, that "the few and small pieces of tin found in Denmark are mentioned at page 266 in the 'Antiqvarisk Tidskrift.'" Instances of the discovery of bronze and tin associated together, would appear, therefore, to be of much rarity in the northern countries of Europe.

Mr Albert Way, in a valuable memoir on the "Enumeration of Blocks or Pigs of Lead and Tin, Relics of Roman Metallurgy, discovered in Great Britain," *Archæological Journal*, vol. xvi. p. 22, gives details and a figure of a curious double pig of tin, 11 inches long and 11 inches wide, dredged up in Falmouth Harbour. He mentions other two smaller blocks or pointed portions of a pig of tin, one 20 inches long by 9 inches wide, and 3 inches in thickness, also found in Cornwall. Mr Way contributes to the same *Journal*, vol. xxiii., another valuable memoir—"Notices of Roman Pigs of Lead found at Bristol, and of Metallurgical Relics in Cornwall, in other parts of England and Wales, and also on the Continent." In the first of Mr Way's memoirs¹ just referred to, he mentions an obtusely pointed fragment of bronze, found with stone mauls in the old workings at the Ormes Head, Llandudno, which he considers part of an ingot of bronze. There is also in the British Museum, he states, a perfect ingot of bronze, pointed at both its extremities, measuring about 15 inches in length, which was found in Livonia.

¹ The Memoirs by Mr John Phillips and by Mr Albert Way, have been printed together by Mr Way, in the *Archæological Journal*, vol. xvi. 1869.

The Rev. Mr Joass has discovered in the ruins of the Broch of Cinn Trolla,¹ in Sutherlandshire, two hammer-marked plates of bronze, which were probably an ancient commercial form of this metal; one of these, measuring $11\frac{1}{4}$ inches in length, by $7\frac{1}{2}$ in breadth, and $\frac{1}{8}$ of an inch in thickness, and weighing 3 lbs. $4\frac{1}{2}$ oz. avoirdupois, is now preserved in our Museum.

These various instances help to give us some little insight into the details of an ancient commerce in metals.² They seem to show that lead, metallic tin, at least an alloy of tin and lead, and also pure copper, as well as the mixed metal, bronze, and even iron,³ were all among the articles of a very early commerce in Britain, and throughout Europe.

MONDAY, 11th March 1872.

DAVID LAING, Esq., LL.D., Foreign Secretary, in the Chair.

The Right Hon. the Earl of Wemyss and March was admitted without ballot, and a ballot having been taken, the following Gentlemen were admitted Fellows:—

Rev. WILLIAM DUKE, M.A., Minister of St Vigean, Forfarshire.

HUGH POLLOCK, Esq., Donnybrook House, Cork.

ALEXANDER SHANNAN STEVENSON, Esq., Tynemouth.

ALEXANDER JOHNSTON WARDEN, Esq., Marybank House, Broughty-Ferry.

The following Donations to the Museum and Library were laid on the table, and thanks voted to the Donors:—

(1.) By Sir HENRY DRYDEN, Bart., Hon. Mem. S.A. Scot., &c.

Two Portfolios of Plans, Sketches and Measurements of Brochs, Stone

¹ See "Archæologia Scotica," Account of Cinn Trolla Broch, &c., by Rev. Mr Joass, vol. v.

² See "The Ancient Workers and Artificers in Metals, from References in the Old Testament, and other Ancient Writers," by James Napier, F.C.S., &c., London and Edinburgh, 1856.

³ For details of Iron, &c., see "The Celt, the Roman and the Saxon," by T. Wright, F.S.A., &c.

Circles, and Lines of Standing Stones in the north of Scotland, comprising the following:—

Ground Plan, Section, and Measurements of the Broch of Yarhouse, Thrumster, Caithness. Seven sheets. (Scale, 3-8ths to 2 feet.)

Plan and Sections of the Broch of Brounaben, Thrumster, Caithness. (Scale, 3-8ths to 2 feet.)

General Plan and Section of the U-shaped group of Standing Stones at Ach-Kinloch (Stemster) Latheron, Caithness (scale, 4-8ths to 10 feet), with detailed plans, elevations, and measurements of each Stone. (Scale, 3-8ths to 2 feet.)

General Plan and Section of Stone Circle at Guidebest, Latheron, Caithness (scale, 4-8ths to 10 feet), and detailed plans and elevations of each Stone. (Scale, 3-8ths to 2 feet.)

Plan and Section of the Broch at Lybster (Crosskirk), in the parish of Reay, Caithness. (Scale, 3-8ths to 2 feet.)

Plan and Sections of the Broch of Castle Chonil, in Glenbeg, near Glenelg, Inverness-shire. Three sheets. (Scale, 3-8ths to 2 feet.)

Plan and Sections of the Broch of Castle-Grugach, at Loch Duich, Inverness-shire. (Scale, 3-8ths to 2 feet.)

General Plan of the seven lines of Standing Stones on "Battle Moss," near Yarhouse Loch, Thrumster, Caithness. (Scale, 4-8ths to 10 feet.)

General Plan of six lines of Standing Stones, converging to a small Cairn, with central Cist, at Garry Whin, near Whaligoe, Caithness. (Scale, 4-8ths to 10 feet.)

General Plan of six lines of Standing Stones, converging towards a Cairn, with central Cist, at Camster, Caithness. (Scale, 4-8ths to 10 feet.)

General Plan and Section of twenty-two lines of Standing Stones at the hill of the "Many Stones," Clyth, Caithness. (Scale, 4-8ths to 10 feet.)

(2.) By DAVID GRIEVE, Esq., F.S.A. Scot.

A Collection of Shells, Bones of Animals, &c., from a Kitchen Midden; on the island of Inchkeith. (See detailed List in subsequent communication by Mr Grieve.)

- (3.) By JOHN CHALMERS, Esq., F.S.A. Scot., and Mr ANDERSON, Keeper of the Museum.

A Collection of Shells, Bones of Animals, Vitrified Matter, &c., from a Kitchen Midden on the level summit of the Crag overlooking Dunsappie Loch, Arthur's Seat.

The shells are those of the common edible shell-fish, including the periwinkle, limpet, and cockle; the bones include those of the ox, sheep, and pig, the long bones being broken and split, and mostly calcined either wholly or partially; the vitrified matter appears to be the result of numerous fires kindled here and there over the area.

- (4.) By JOHN M'CONNEL, jun., Esq., Chapelheron, through BENJAMIN NEEVE PEACH, Esq., of the Geological Survey.

Polished Celt of indurated Claystone, 7 inches in length by $2\frac{3}{4}$ inches broad at the cutting end, narrowing to $1\frac{1}{2}$ inches at the small end, found on the farm of Chapelheron, near Whithorn.

- (5.) By ROBERT MERCER, of Scotsbank, Esq., F.S.A. Scot., through JAMES DRUMMOND, Esq., R.S.A., F.S.A. Scot.

Two Bronze Patellas. One has the handle, $6\frac{1}{2}$ inches long, and 1 inch broad where it joins to the bowl, terminating at the end in a hook like the head of a serpent; the bowl, which is shallow, is 6 inches diameter and $1\frac{3}{4}$ inch deep inside. The other, which wants the handle, is elegantly made and covered outside with an extremely fine green patina. It is tinned inside, and also on the outside in a band $\frac{3}{4}$ of an inch wide round the upper border immediately below the rim. The bowl measures internally $6\frac{3}{4}$ inches diameter and 4 inches deep.

- (6.) By WILLIAM FETTES DOUGLAS, Esq., R.S.A.

Neunter Bericht der Konigl. Schleswig Holstein-Lauenburgischen Gesellschaft für die Sammlung und Erhaltung Vaterlandischer Altherthümer. 1844. 8vo.

- (7.) By the SOCIETY OF ANTIQUARIES OF LONDON.

Proceedings of the Society of Antiquaries of London. Second Series. Vol. V. No. II.

(8.) By the HISTORICAL SOCIETY OF LANCASHIRE AND CHESHIRE.
Transactions of the Historical Society of Lancashire and Cheshire.
New Series. Vol. IX.

(9.) By the Right Hon. Lord ROMILLY, the Master of the Rolls.
Calendar of State Papers, Foreign. 8vo. 1566-1568.

(10.) By the MANX SOCIETY.
Records of the Tynwald and St John's Chapels. 8vo. Vol. XIX.

(11.) By ROBERT ORMISTON, Esq., through COSMO INNES, Esq., LL.D.,
F.S.A. Scot.
Four Letters from Oliver Cromwell to Sir Arthur Heselridge, Governor
of Newcastle-upon-Tyne. 8vo, pp. 17.

There were also exhibited :—

(1.) By Rev. NORMAN MACLEOD, D.D., Barony Parish, Glasgow.
Bronze Tortoise-shaped Brooch, and Bronze Pin, 6 inches in length,
with open lozenge-shaped head, found in the island of Tiree.

(2.) By JOHN MACDONALD, Esq., Newton, Lochmaddy.
Comb of Bone, with semicircular back, 7 inches in length ; flat circular
Bronze Brooch with Rune-like ornament, $1\frac{1}{4}$ inches in diameter ; a small
Bronze Brooch or Buckle, $\frac{1}{2}$ inch in diameter ; and Flint Arrowhead,
found in clearing out a stone cist in a sandy hillock in South Uist.

(3.) By MILLEN COUGHTRY, Esq., M.B., Edinburgh.
Three Combs from the South Pacific, made of Reeds tied together.
(See Plate XVIII., fig. 11.)

The following Communications were read :—